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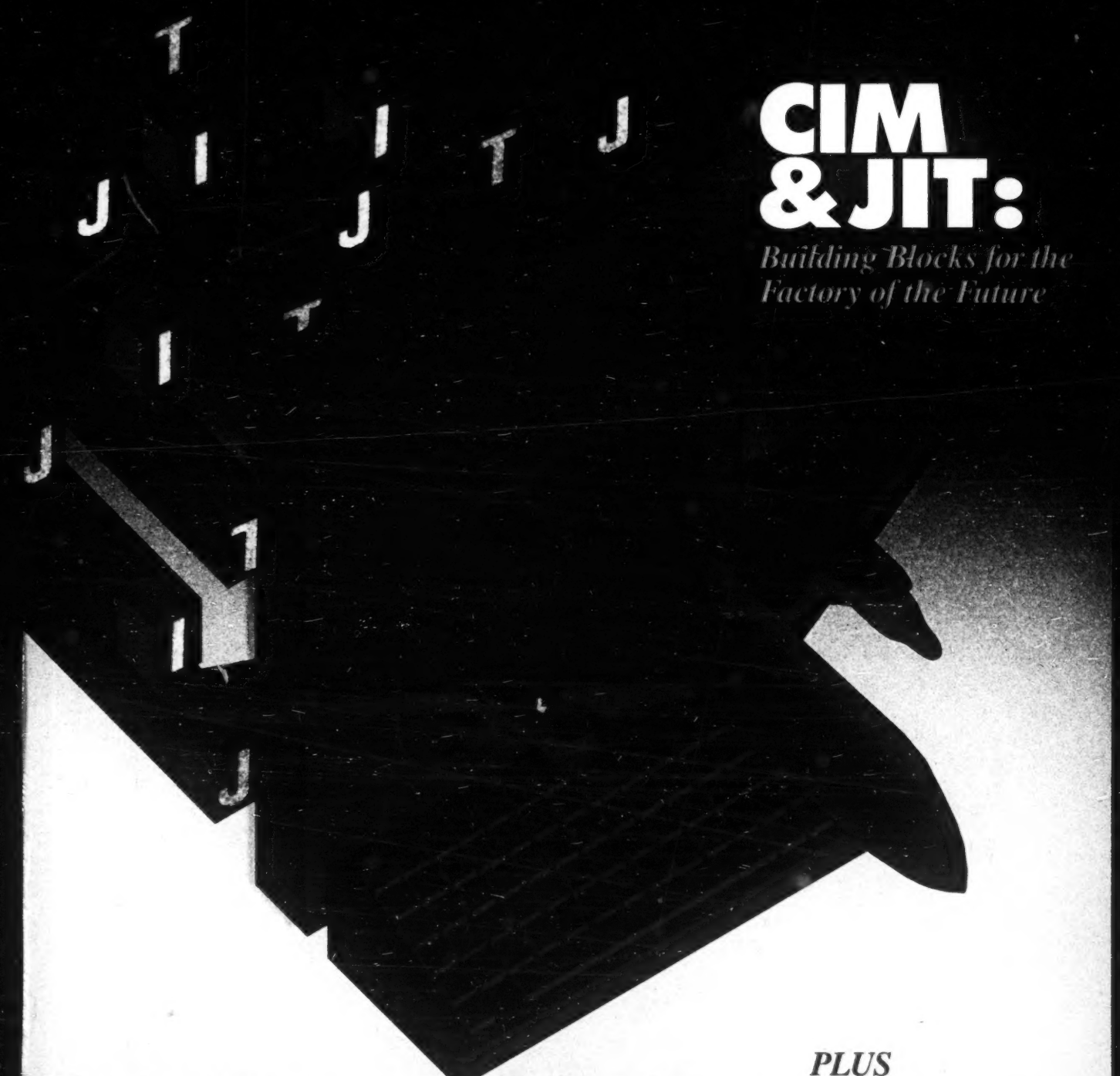
PRODUCTION

FOR MANAGERS OF MANUFACTURING TECHNOLOGY



CIM & JIT:

Building Blocks for the Factory of the Future

How CAD/CAM is Changing the Shape of Manufacturing in the U.S. and Europe

PRODUCTION'S Guide to Computers ...And Much More

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A Special Roundtable Discussion on CIM

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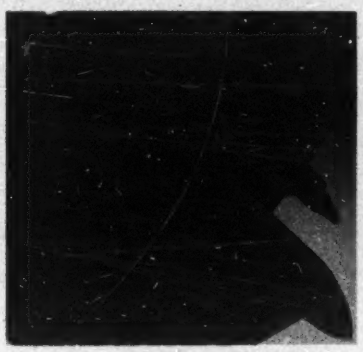

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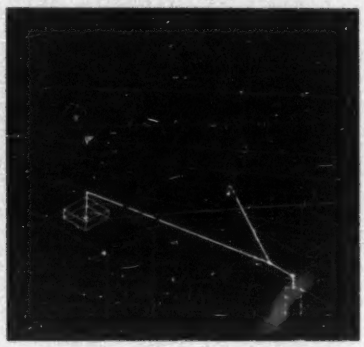

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World News UPDATE

WASHINGTON

Machine Tool Orders Up In January

January orders for new machine tools posted a 7.8 pct increase over December's figures, a positive sign some manufacturing executives indicated for the year ahead.

New orders for the month totaled $188.65 million. However, total machine tool shipments stood at $145.7 million, down 61.1 pct from December, due to the year-end closing of work in process by machine tool builders, according to statistics compiled by the National Machine Tool Builders' Association (NMTBA).

While "mixed" was the key word for the state of the machine tool industry in 1985, some industry executives told PRODUCTION Magazine that 1986 is shaping up to be a good year for new orders.

"It's one hell of a year," beamed Mr. Henry Mamlok, president, Jacobson Tool & Manufacturing Corp., Skokie, Ill. "We're busier now than in the last three, four years." Mr. Mamlok said his company, which manufacturers spindle drilling and tapping machines, received a boost from military-related orders, but added that 80 pct of his business stemmed from new orders. "It's feast or famine in this business...1983 and '84 were slow, but business picked up at the end of 1985. I'm just about sold out for 1986 and its only February," he added.

Mr. James Bushong, general manager, engineering & marketing div., Hitachi Seiki U.S.A., Inc., Congers, NY., echoed Mr. Mamlok's projection for 1986. "From our fiscal year (March 1985-March 1986) we had an all-time record high (in sales). Our next fiscal period should be just as good," said Mr. Bushong. He attributed the upturn in sales to the company's development of a new distributor base, and new product introduction.

Added Mr. H. Stanton Cheyney, vice president, marketing, Niagara Machine & Tool Works, Buffalo, NY, "Business is getting better...1985 was a super year and 1986 will be a good year, but not a boom year," he said. The company manufacturers straight-side presses, gap-frame presses, mechanical and hydrualic shears, CNC controls for shears, mechanical and hydraulic press brakes, and CNC controls.

However, not all executives were quite as optimistic. Mr. D. Feller, vice president, marketing, Strippit, Inc., Akron, OH, said that business is currently "flat" but leaning towards an "upturn." Mr. Feller said that Strippit, because it is in the forming-end of the industry, faces competition from foreign producers. He said as the dollar declines, the company should see improvement.

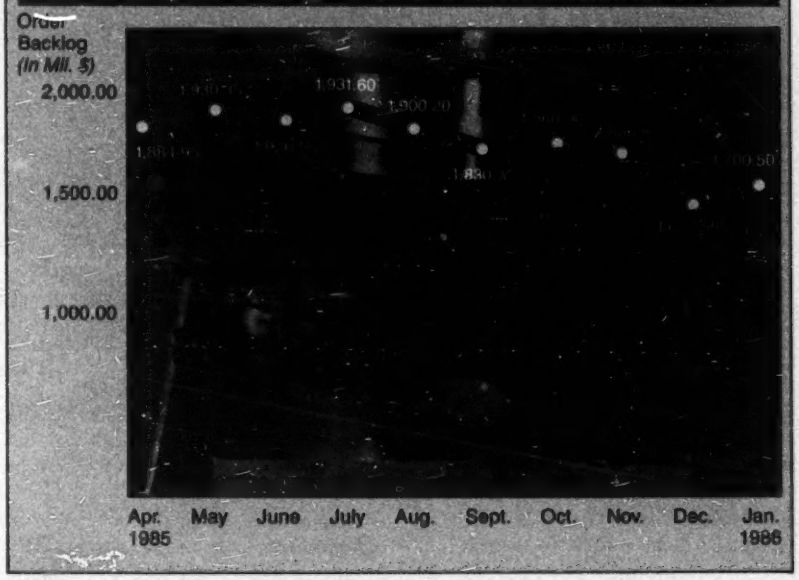
Overall, January 1986 orders were down 10.8 pct compared to January, 1985. Metal-cutting machine tool orders totaled $135 million for January 15.8 pct above December's level. Metal-forming machine tool orders however, came to $53.6 million, representing a decline of 8.2 pct from December.

Metal-cutting machine tool shipments, at $91.3 million, were down 68.3 pct from their December total of $287.9 million. Metal-forming machine tool shipments were $54.4 million, down 37.1 pct from the December figure of $86.5 million.

The shipments total of $145.7 million was down from December's $374.3 million, accounting for the 61.1 pct decline. January's shipments resulted in $1.7 billion backlog at the end of January, up from $1.6 billion at the end of December.

–Reported by
Tom Halligan/Philadelphia

MACHINE TOOL ORDERS
Backlog



WEST

Commercial Aircraft Industry Optimistic for Rest of Decade

With new airplane orders streaking in and market conditions bullish, commercial aircraft manufacturers are working on new technology programs and issuing optimistic market predictions for the remainder of the decade.

Airbus Industrie, the European manufacturing consortium that has been challenging America's predominance in the aerospace field, has been busily marketing its all-new A-320 single-aisle jet, which will be delivered to customers by the end of 1989. The A-320, which will make more extensive use of composites and alloys and come equipped with more fuel-efficient engines than present conventional commercial jets, already is being assembled in stages at the factories of the consortium partners.

Final assembly will occur at Airbus' facility in Toulouse, France.

Ninety firm orders for the new airplane have been received. Option orders have climbed to 257.

Encouraged by its success and eager to expand its product line to more forcefully compete with large U.S. manufacturers like The Boeing Co. and McDonnell Douglas Corp., Airbus officials are moving ahead with plans to develop two additional new aircraft.

An estimated $2.5 billion will be spent on the new programs, with an official production launching set for early 1987.

The first of these two new Airbus aircraft, the A-330, will be a twin-engine plane with a 320 seating capacity and a 5,000 mile range.

The second, the A-340, will come equipped with four engines, seat 260 and cruise some 6,800 miles.

The two new planes will share common fuselage, wing, cockpit and control designs. A new variable camber wing design which will reduce fuel consumption is being tested by the Airbus partners.

Airbus officials said the A-340 will offer aircraft mile costs approximately 30 to 35 pct lower than the Boeing 747-200. The A-330 will come in about 7 to 10 pct below the 747.

Not to be outdone, archrival Boeing recently released a picture of its all-new 7J7 jet, a 150-seat airliner that won't be delivered until 1992.

Boeing hopes the plane will be a foil to the new Airbus A-320. Although the Airbus jet will beat Boeing to the market by a couple of years, Boeing officials believe the design of the 7J7, which is expected to include all-new propfan engine technology, will be such an improvement that it will help make the A-320 nearly obsolete.

The airplane will make extensive use of lightweight materials, fiber-optic control systems, advanced airfoils and more compact flight control actuators.

More than 700 personnel are working on the new project.

The Douglas Aircraft subsidiary of McDonnell Douglas Corp. also is working on new derivative airplanes, including the MD-11, a wide-cabin tri-jet that will replace the DC-10 and compete with the 747 and the A-330 and A-340.

But Douglas, like Boeing, is investing heavily in research and development of the propfan—also known as ultra-high bypass—engine technology. Douglas planners believe the new engines could improve fuel efficiency from 25 to 30 pct over the best conventional jet turbofans. Airbus has been less optimistic about the engine breakthroughs than its two American rivals.

The new program activity is easy to understand. All three competing manufacturers are coming off high-flying years. Airbus logged 92 firm orders for new airplanes in 1984, making it one of the best years in the company's history.

"We can all be proud of our achievements in 1985," said Jean Pierson, Airbus Industrie president. "But there is no room for complacency in a technologically competitive industry such as ours."

Indeed not. Boeing logged 390 firm orders in 1985, compared to 168 in 1984. It was the company's third highest year for new aircraft orders in history.

There could be much more of the same in the years ahead. Douglas estimates that during the next 15 years a potential market exists for more than 5,400 new passenger aircraft units valued at nearly $249 billion in 1985 dollars.

COMMERCIAL TRANSPORTATION AIRCRAFT SHIPMENTS

	General Aviation	$ Amount (Mil.)
1985	277	$8.499
1984	185	$5.689
1983	282	$8.000
1982	232	$6.246
1981	387	$9.706

Source: Aerospace Industries Assoc.

After a lackluster performance in 1984, commercial aircraft orders took off in 1985. Orders are expected to remain at a high level through the end of the decade.

General Aircraft Industry Struggling

America's general aircraft industry is struggling through another difficult year, with proposed tax law changes, uncertain capital spending and strong foreign competition all combining to drag down the industry.

Unlike their larger counterparts in the commercial airframe manufacturing industry, the smaller makers of business aircraft have yet to see the industry emerge from a recession that took root four years ago.

"This year will be another year of great challenge," said Thomas J. Smith, chairman of the General Aviation Manufacturers Association and president of Fairchild Aircraft Corp.

"We make no representation that the turn-around is in sight. But general aviation manufacturers are moving in new directions to face the future, to fit new marketplace realities, to find solutions that will allow us to grow in the future. General aviation is changing. We're changing with it," Mr. Smith said.

The changes, however, have been very painful for the smaller business aircraft manufacturers. Some companies have merged. Others have cut back their product lines and charted layoffs.

The Boeing Company recently finalized its purchased of the troubled de Havilland Aircraft of Canada, which produces regional commuter aircraft. Boeing plans to fund new product development and upgrade facilities.

Lear Siegler Inc., which is headquartered in Santa Monica, Calif., recently announced that it was temporarily suspending production of most Piper airplanes because of falling demand.

The discountinued models, which are all piston-powered, include the Warrior, Archer, Dakota, Turbo Arrow, Saratoga SP, Turbo Saratoga SP and Chieftan. Analysts expect Lear's Piper unit to lose more than $20 million in the 1986 fiscal year than ends June 30, double last year's losses.

Gates Learjet Corp., which is based in Tucson, Ariz., also has suffered losses and recently pulled out of a joint venture with Piaggio of Italy to produce a new business jet because it couldn't afford the research expenses involved.

James B. Taylor, the company president, said 1985 was a difficult year for Gates. "We have spent the last six months posturing the company to work our way out of some severe problem areas," he said.

"Much of this effort is now behind us and I feel we are on solid ground for the future," said Mr. Taylor.

Gates lost $10.6 million in 1984 and was expected to post a slightly larger loss in 1985.

GENERAL AVIATION AIRCRAFT SHIPMENTS

	General Aviation	$ Amount (Bil.)
1985	2,032	$1.42
1984	2,432	$1.68
1983	2,691	$1.47
1982	4,266	$2.00
1981	9,457	$2.92

Source: General Aviation Manufacturers Assoc.

The general aviation industry is in the doldrums as deliveries in 1985 continued to sag well below the 1981 total of $2.9 billion.

In response, Gates has launched an aggressive marketing effort for 1986, which includes export customers like the People's Republic of China. The company also has been attempting to diversify its product base; it won a $14 million subcontract last year from Martin Marietta to build space shuttle components.

Gates also installed new management. And the firm closely evaluated its manufacturing operations in Tucson and Wichita and decided, despite the difficulties, to reverse an earlier decision and keep both facilities operating.

"Even though the business and corporate aircraft market has not returned to the levels experienced in the early 1980s, I believe one positive aspect of this thorough study has been to posture the company for the future," explained Mr. Taylor.

"Actions taken to enhance marketing and reduce operating costs by the company's new management team have resulted in substantial progress toward returning Gates Learjet to profitability," he added.

Such problems likely will continue to impact the entire general aircraft market through the remainder of this year.

GAMA officials expect little increase in corporate capital spending, which will depress orders for more expensive business jets. Proposals to change tax regulations and the potential loss of the Investment Tax Credit also is hurting the industry.

On the positive side, GAMA reported increased sales to military and government buyers and increasing business in retrofits.

GAMA reported deliveries and billings were down in 1985. Turboprop deliveries rose 19.6 pct. But jet sales were down 15.3 pct and single engine deliveries fell 15.4 pct. Deliveries of piston twin aircraft fell 48 pct.

IBM, DEC Vie For Plant-Level Computer Mart

The race between IBM and DEC to out-distance each other in the plant-level computer market is taking a new turn.

According to the Yankee Group, a Boston-based market research firm, IBM will (through its direct and third-party marketing channels) rack up 46 pct of the total U.S. market for computers at manufacturing facilities. DEC placed second with (through all channels) more than 22 pct of the market.

However, IBM and DEC have widely different positions in segments of the manufacturing computer market, according to the research firm.

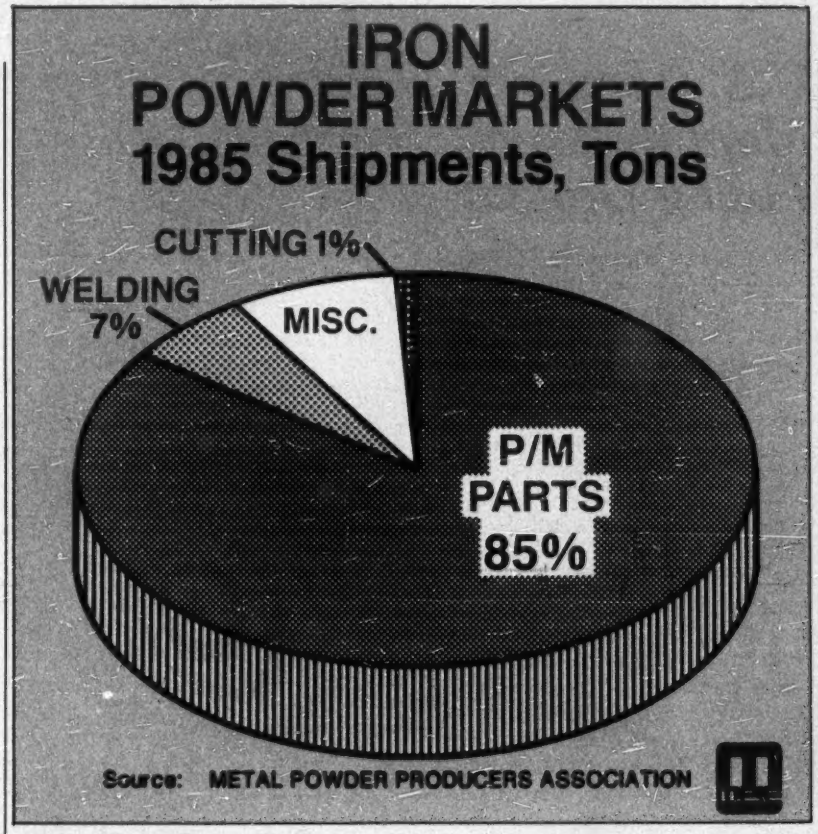
Although IBM is first in the market for large computers running plant-wide applications, it is second in the market for supervisory-level computers, which coordinate multiple work cells. DEC's position is the reverse. The company is first at the supervisory level, but is intent on attracting a larger share in the plant-level computer market.

According to the Yankee Group, DEC has made inroads into IBM's market at a better clip than IBM's has into DEC's market. The firm said that DEC "may be capturing the U.S. automation leaders at large manufacturing sites."

Further findings indicated that DEC's franchise is in large manufacturing sites. DEC has a stronger position among large users than it does overall, both on its traditional supervisory-level market and at the plant level. IBM has not made significant inroads at the supervisory level at large user-sites as it has made in the overall market, according to the survey.

It is estimated that plants with more than 500 employees accounted for 65 pct of the total manufacturing computer dollars in 1985.

–Reported by
Sandra Brooks/Chicago and
Robert Huber/Detroit



EAST

Metal Powder Group Bullish on Growth

The Metal Powder Industries Federation (MPIF) is bullish on the potential growth of the industry in the near future.

The MPIF cited a recent study it conducted that indicated the conventional powder metallurgy (PM) parts business could consume an additional 650,000 tons of iron, copper, stainless steel and aluminum powders, representing more than three times current usage.

According to Kempton H. Roll, MPIF executive director, PM has the capability from a design, performance and cost effectiveness point of view to take business away from the stamping, forging, casting, machining and plastics industries.

Permanent mold casting, screw machining, broaching and plastic compression molding offer the greatest potential for PM inroads, according to Mr. Roll. A net-shape forming process, PM offers significant raw materials and energy savings, excellent tolerance and weight control on metal parts and very favorable cost savings, Mr. Koll added.

He cited the U.S. automotive industry, which is converting significant numbers of parts to PM from castings, forgings and machined parts, in an effort to more effectively compete in the world market.

In order to further spread the word on the benefits of PM, the MPIF is continuing its marketing program begun in 1983 to educate design engineers and the general industrial public about the advantages of using PM.

U.S. Abrasives Manufacturers Losing Ground

The abrasives industry, facing a continually shrinking market because of foreign competition, projects 1986 to closely mirror 1985, continuing the decline of the total size of the U.S. market projected to slip by 1 to 2 pct over the next few years.

Unit sales for bonded and coated abrasives in the U.S. last year were generally below projections, according to Robert N. Hamilton, vice president, Abrasives Marketing Group, Norton Co., Worcester, Mass. Major consumers of abrasive products such as primary metals, construction equipment, forest products and machine tools were less active than forecast. Moreover, there was also some adjustment of inventories in early 1985, due to 1984 inventories which were not used as quickly as planned, Mr. Hamilton said.

"More importantly for the long-term was that in 1985 the abrasives industry strongly felt the impact of permanently shrinking markets," continued Mr. Hamilton. "Abrasives have always been a cyclical business. Over the past few years, however, several factors have caused a basic restructuring of our primary markets. For instance, the industries that represent the major users of abrasive products in the U.S. have gotten permanently smaller because of foreign competition," he said.

Mr. Hamilton stressed that other U.S. industries, such as automobiles, import major end-product components. "Thirty percent of a typical U.S. car is made outside the U.S.; unfortunately for the abrasives industry, that thirty percent represents much of the grinding. The cars that are made here are smaller, requiring less use of abrasives," Mr. Hamilton said.

Mr. Hamilton projected that 1986 unit sales of abrasives will remain flat over 1985.

–Reported by
Tom Halligan/Philadelphia

GEORGIA'S AEROSPACE COMPANIES SPAN BROAD RANGE

LOCKHEED-GEORGIA	
18,000 employees	Large transport, airlift aircraft
GULFSTREAM AEROSPACE	
3,500 employees	Corporate jet aircraft
ROCKWELL MISSILE SYSTEMS	
1,300 employees	Tactical missiles, subassemblies
CALCUSEARCH	
Seven employees	Aircraft test scale models
CHEROKEE TOOL	
20 employees	Aircraft parts
AID CORP.	
50 employees	Aerospace components

Source: AIDC's High Tech Industries in Georgia, 1985.

SOUTH

Georgia Quietly Rising As Aerospace Industry Hub

Georgia's renowned Southern charm and hospitality is quietly enticing a notable amount of aerospace and defense-related industry to the state.

Preliminary findings from a soon-to-be-published study, conducted by Georgia Tech, confirm that Georgia is currently home to 178 aerospace-related companies. The state is working with another 50 or so active prospects in the aerospace and defense-related industries interested in joining those already established.

Of the 178 companies, slightly more than a quarter classify manufacturing as their primary business activity. Manufacturers account for over 95 pct of the more than $800 million in investment in property, plant, and equipment (before accumulated depreciation) in the state's aerospace industry.

The research indicated that total aerospace employment in the state is 27,590, distributed primarily among those in jobs as production workers (45 pct), technicians (26 pct), and scientists and engineers (14 pct). Most of the employment is concentrated in metropolitan Atlanta (skewed by Lockheed-Georgia Co.'s presence there), though pockets of aerospace employment exist across the state.

Georgia's aerospace industry stretches across not only a wide geographic span, but also a wide range of sizes. According to the study, 54 pct of the state's aerospace companies employ 25 persons or fewer. In recent years especially, small aerospace technology ventures have sprung up near Georgia Tech.

The solid growth of the state's aerospace industry has been neither an accident nor the simple consequence of Southern hospitality. Rather, the combination of several key factors has been responsible.

"Georgia has built up the critical mass needed for the state to be a magnet for aerospace industry," said John

Warden, project manager for the Georgia Tech study. Mr. Warden and state economic development experts cited several key elements to Georgia's attractiveness as a location for aerospace companies:

—Large military installations: The U.S. Air Force base at Warner Robins, near Macon, registered more than $1 billion in aerospace goods and services expenditures in 1984. Proximity to large bases is often attractive to suppliers.

—Strong educational base: Georgia Tech ranks eighth nationally in R&D expenditures for aerospace/astronautical engineering and is the acknowledged leader in rotary-wing aircraft technology. Tech has both spawned small aerospace companies and has been a magnet for others needing access to its technological capabilities and expert engineers. Technology-dependent companies "need brain power to lead or at least keep up," said Mr. Warden. Though scientists and engineers make up only 13.5 pct of Georgia's aerospace employment, they form the most critical component.

—Congressional clout on defense matters: A less direct, though clearly important factor in Georgia's aerospace growth is the state's long tradition of congressional clout on defense.

The legacy of leadership has been passed on by the likes of former Senator Richard Russell and former Congressman Carl Vinson, to Sen. Sam Nunn (D), now ranking minority member of the Senate Armed Services Committee.

—Creative incentives: Over the years, Georgia has been innovative in designing attractive incentives for both new and relocating companies in technology industries, including aerospace. Since 1978, 86 high-technology companies moved to Georgia from other states.

The state's economic development office intends to use the study's research to help attract still more aerospace industry to Georgia.

–Reported by
Leslie Goldwater/Atlanta

EUROPE

GM Forms European Organization

General Motors recently announced in London that it is setting up a European organization to coordinate the activities of GM companies in 17 countries. The new group will be called General Motors Europe—Passenger Cars, and will be based in Zurich, Switzerland.

One hundred of the proposed 200 employees will be drawn from Opel in Germany (Zurich is German-speaking) and the others will come from GM companies all over Europe.

GM said the new organization has become necessary because of the growing importance and competitiveness of the European car market. The area produced 10.7 million cars in 1984 (compared with 8.8 million in the U.S. and just over 7 million in Japan) and this figure is forecast to rise to 12.3 million by 1990.

"Our substantially increased car sales in Europe, a competitive situation that calls for quick decisions and an environment that is becoming increasingly complex and interconnected, all demand strengthened coordination among our European operations," noted GM president James MacDonald.

The new organization follows the pattern of Ford Europe, set up around 16 years ago, in that it has no legal status and serves in an advisory capacity. The legal and business situation of the various national GM companies will not change.

GM produced 1.2 million cars in Europe last year. The group's share of the fiercely-contested Euro market has steadily increased from 9.6 pct in 1982 to over 11.4 pct last year. This puts the American giant up with Volkswagen, Fiat, Ford, PSA and Renault in a struggle for market leadership with only 2 pct difference among the top five.

However, GM's two main producing units, Opel and Vauxhall, have both been losing money. GM sustained a net loss in Europe of $291 million on total sales (including parts and trucks) of $7 billion. This has led to accusations that GM has been buying market share to overtake Ford outside the U.S.

Asea Acquires VS Technology

Asea Holdings Ltd, the British end of the Swedish electrical giant, is to acquire the VS Technology group, a British high-tech automation company.

VS mainly builds systems for the motor industry and scored a world first when it designed and supplied the robotic glazing system for the Austin Rover Montego assembly line, which included vision sensing. In recent years, VS has developed expertise in vision control, machine intelligence, automated adhesive technology and automatic assembly.

The acquisition will fit in very well with Asea Robotics, which in recent years has established itself as Europe's biggest robot manufacturer. Percy Barnevik, Asea's 44-year-old chief executive, said recently that Asea intended to establish a stronger presence in the UK and was on the lookout for likely acquisitions.

It is presently not known if Asea is interested in making a bid for Fairey Automation, which is being sold off by its parent company. There has been speculation that DEA, the Italian robotmaker, may want to acquire Fairey (mainly because the two firms have a licencing agreement) but this is denied by the British company. However, a spokesman for Fairey said that "it is having discussions with a number of intersted parties."

–Reported by
Peter Mullins/Great Britain